REMARKS:

1) Referring to item 10) of the Office Action Summary, and section 1 on page 2 of the Office Action, the objection to the drawings is respectfully traversed in view of the Replacement Sheets that were already filed on December 12, 2005. In the Replacement Sheets, Figs. 1, 2, 3 and 4 were labeled as "PRIOR ART" in conformance with the written description. Please approve and enter the Replacement Sheets of December 12, 2005 and withdraw the objection to the drawings.

2) Referring to item 9) of the Office Action Summary, and sections 2 and 3 on pages 2 and 3 of the Office Action, the objection to the specification has been taken into account in the present amendment. In accordance with the PCT procedures, the original specification was a direct literal translation of the foreign language text of the corresponding PCT International Application. The specification has now been amended in an editorial and formal manner to add typical US section headings, to remove the explicit reference to claim numbers, to correct minor editorial errors, and to improve the US form of the Abstract. Please withdraw the objection to the specification.

3) Further in accordance with the PCT procedures, the original claims were a direct literal translation of the foreign language claims of the corresponding PCT International Application. Claims 1 to 18 have been canceled. Claim 19 has been amended editorially, and new claims 20 to 31 have been added. Claims 20

to 28 are based on subject matter from original claims 2 and 11 to 18, with editorial revisions. The editorial revisions in claims 19 to 28 are submitted for editorial and stylistic purposes to avoid features of a direct literal translation, and to better conform to typical US claim style. These claim revisions are not submitted for reasons of patentability. Additionally, claim 19 has been substantively amended by incorporating features from claim 12 and the specification at page 3 line 23 to page 4 line 6. The new claims 29 to 31 have been drafted "from the ground up", so as to cover features of the invention in a somewhat different claim style and with different claim terminology in comparison to the original literally translated claims. The new claims are supported by the original claims and original disclosure as shown in the following table, and do not introduce any new matter. Entry and consideration of the claim amendment and the new claims are respectfully requested.

new claims	(amended) 19	20	21	22	23	24	25	26	27
original support	cl 19, 12 pg3 ln23 – pg4 ln6	cl 2	cl 11	cl 12	cl 13	cl 14	cl 15	cl 17	cl 18

new claims	28	29	30	31
original support	cl 16	cl 1, 11, 12, 13, 19; pg 3 ln 15 – pg 4 ln 10; pg 10 ln 1 – pg 11 ln 22; Figs. 5, 6	pg 8 ln 21-22	cl 12

4) Referring to section 5 on page 3 of the Office Action, the rejection of claims 1, 2 and 11 to 19 as indefinite under 35 USC 112(2) has been obviated by the present amendment. Amended claim 19 and the new claims do not use indefinite limitations such as "especially" and "preferably". Accordingly, please withdraw the rejection under 35 USC 112(2).

5) Referring to section 7 on page 4 of the Office Action, the rejection of claims 1, 2 and 11 to 19 as anticipated by US Patent 6,491,482 (Fenkl et al.) is respectfully traversed.

Present independent claim 19 is directed to a milling method in which a rotating milling tool is moved along several curved milling paths respectively having different curvatures in a workpiece material. In the milling operation along each curved milling path, after the circumferential contact of the milling tool with the workpiece material reaches a maximum permissible value, the curvature at each point along the respective curved path is determined so that the circumferential contact (of the milling tool with the workpiece material) is optimized to the maximum permissible value. Particularly, the curvature at each point along each curved path is determined dependent on the tool radius of the milling tool, the depression to be milled, and a milling contour of the immediately preceding curved path.

A main point of the present invention is thus <u>to determine the curvature of each respective curved milling path in such a manner so that the circumferential contact between the milling tool and the workpiece material is optimized to the maximum permissible value</u>. This can be seen in an example in Fig. 5 of

the present application, where the Y-axis shows the value of the circumferential contact of the milling tool with the workpiece material during a respective milling path, and the X-axis shows the position or travel of the milling tool along the milling path. Such an optimization of the circumferential contact is achieved by taking into account the tool radius of the milling tool, the shape of the depression to be milled, and a milling contour of the immediately preceding milling path, so as to maximize the circumferential contact (up to the maximum permitted value) as the milling tool progresses along a respective milling path.

The Fenkl et al. patent does not disclose and would not have suggested any of the abovementioned features of the invention. Fenkl et al. disclose a milling method in which the milling tool is moved along a <u>single continuous spiral guide path without ever lifting the tool out of contact with the workpiece material</u> for an entire milled component or a given depth slice thereof (abstract, col. 1 line 54 to col. 2 line 21, Figs. 1, 2). Thus, the key object of Fenkl et al. is to carry out a milling operation with only a single continuous curved milling path, and purposely not a plurality of curved milling paths as according to the invention.

Fenkl et al. <u>do not disclose and would not have suggested to determine a curvature of the milling path so as to maximize the circumferential contact of the milling tool with the workpiece material</u>. Fenkl et al. do not disclose any teachings or suggestions in this regard. Instead, the curvature of the single spiral milling path is determined so as to achieve a

smooth linkage of "equipotential lines 6" around the profile of the milled component that is to be produced (col. 3 lines 14 to 49). The location of the milling path intersecting a given "field line 3" is simply determined by dividing the length of the field line, i.e. the space between the outer surface of the workpiece material (1) and the finished surface of the component (2) to be milled, into an equal number of milling steps represented by the number of spiral turns used to complete the milling (see Figs. 1a and 1b, and col. 3 lines 14 to 32).

So, in the method of Fenkl et al., the circumferential contact of the milling tool with the workpiece material is simply determined at each location by a given fraction of the total distance between the surface of the milled component (2) to be formed and the surface of the workpiece (1) along a given field line. Thus, at locations where there is more material to be removed, the circumferential contact will be proportionally greater, and at locations where there is less material to be removed the circumferential contact will be proportionally smaller.

Such a technique for determining a single continuous spiral milling path does not give any consideration to, and would not have suggested, determining a curvature so as to optimize the circumferential contact of the milling tool with the workpiece material to a maximum permissible circumferential contact value. In fact, any chance of maximizing the circumferential contact as according to the present invention would be "sacrificed" in order to instead achieve a single continuous spiral milling path according to Fenkl et al.

Imagine a variant of Fig. 1c of Fenkl et al. in which a portion of the structural component (2) to be formed is extremely close to the outer surface of the workpiece material (1) at one location. According to the teachings of Fenkl et al., the circumferential contact of the milling tool with the workpiece material around the area of this location would be very small at each "equipotential line" pass of the continuous spiral path, in order to maintain the single continuous spiral milling path. It is clear that the circumferential contact of the milling tool would not be optimized to the maximum permissible value at such a location.

There also is no teaching and would have been no suggestion by Fenkl et al., that the curvature at each point along a respective milling path should be determined dependent on the tool radius of the milling tool, the depression to be milled, and the milling contour of the immediately previous milling path (compare col. 3 lines 14 to 49 of the reference).

For the above reasons, the invention of present claim 19 is not anticipated and would not have been made obvious by Fenkl et al. The dependent claims 20 to 28 are patentable already due to their dependence. The Examiner is respectfully requested to withdraw the rejection applying Fenkl et al.

6) New independent claim 29 is directed to a method of milling a material to produce a milled structural component, which involves advancing the rotating milling tool successively along plural successive milling paths in the material so as to mill a depression into the material. Each one of the milling paths

includes a beginning portion, a curved main milling portion, and an exit portion in succession. In the beginning portion of each milling path, the milling tool is advanced into the material <u>beginning from a zero value of a circumferential contact</u> between the milling tool and the material, <u>up to a maximum value of the circumferential contact</u>. Then, in the main milling portion of each milling path, the curvature of the milling path is determined so as to <u>maintain the maximum value of the circumferential contact</u> as the milling tool is advanced along the main milling portion. Finally, in the exit portion of each milling path, the milling tool is withdrawn from the material <u>while reducing the circumferential contact from the maximum value to the zero value</u>. A representative example of the circumferential contact (Y-axis) relative to the position (X-axis) of the milling tool along a milling path is shown in Fig. 5 of the present application. Each one of the milling paths follows such a progression of the circumferential contact. Contrary to the present invention, Fenkl et al. disclose a single continuous milling path for milling a component or a depth slice thereof, rather than plural successive milling paths that each involve beginning and ending at a zero value of the circumferential contact. Such "lifting" of the tool out of contact from the workpiece material is expressly to be avoided according to Fenkl et al. (see abstract, col. 1 line 66 to col. 2 line 18). Such a return to a zero value of circumferential contact is contrary to the required continuous material removal along a spiral path according to Fenkl et al. Furthermore, Fenkl et al. do not disclose and would not have suggested any steps or

measures to maintain the circumferential contact at the maximum value during the main milling portion of each one of successive milling paths, as discussed above. For these reasons, claim 29 and its dependent claims are also patentably distinguishable over the prior art.

7) The additional prior art made of record requires no particular comments because it has not been applied against the claims.

8) Favorable reconsideration and allowance of the application, including all present claims 19 to 31, are respectfully requested.

Respectfully submitted,
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WFF:he/4925
Enclosures:
Transmittal Cover Sheet
Term Extension Request
Form PTO-2038

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CERTIFICATE OF FAX TRANSMISSION:

I hereby certify that this correspondence with all indicated enclosures is being transmitted by telefax to (571) 273-8300 on the date indicated below, and is addressed to: COMMISSIONER FOR PATENTS, P.O. BOX 1450, ALEXANDRIA, VA 22313-1450.

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